ANTA 601 Report

Antarctic Specially Protected Areas
ARE THEY SERVING THE ANTARCTIC WELL?

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Cover photo
Terra Nova Hut, Cape Evans – taken during the PCAS field visit, 23 December 2009.

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1 INTRODUCTION

This report sets out to respond to the question imposed: Antarctic Specially Protected Areas – Are they serving the Antarctic well?

The Treaty documents that define Antarctic Specially Protected Areas (ASPA) are summarized, and the requirements and guidelines for designation are outlined. An analysis of the 71 existing ASPA is completed.

Using a series of case studies for the three main values – Historic, Environmental and Scientific, the effectiveness of current ASPA is reviewed, and generally is found to be serving the Antarctic well.

The report identifies a major weakness in that there is not a systematic framework to establish a comprehensive and representative network of protected areas. Frameworks from the Treaty system and elsewhere are suggested as a possible basis for establishing such networks, and a process involving Treaty committees is outlined.

Discovery Hut, taken during the PCAS field visit, 30 December 2009.

2 BACKGROUND

2.1 Protection prior to Annex V

Protection of the Antarctic environment has been a central theme in the cooperation among Antarctic Treaty Parties. Specially protected areas were first established under the Antarctic Treaty in 1964 under the Agreed Measures for the Conservation of Antarctic Fauna and Flora. Under these and subsequent measures five categories of protected areas were established:

- Specially Protected Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Historic Sites and Monuments (HSM)
- Specially Reserved Areas (SRA)
- Multiple-use Planning Areas (MPA)

2.2 Current situation

2.2.1 Protected Areas – Annex V

Annex V to the Protocol on Environmental Protection (the Protocol) was adopted in Madrid in 1991 and entered into force in 2002. Under Annex V (refer to Appendix 1) certain areas of Antarctica are set aside as protected areas to preserve their special values. Any area, including any marine area, may be designated as a protected area.

In 2002 all SPAs and SSSIs were designated as Antarctic Specially Protected Areas (ASPA) and were renamed and renumbered accordingly, with new ASPA being added to the numbered list in consecutive order.

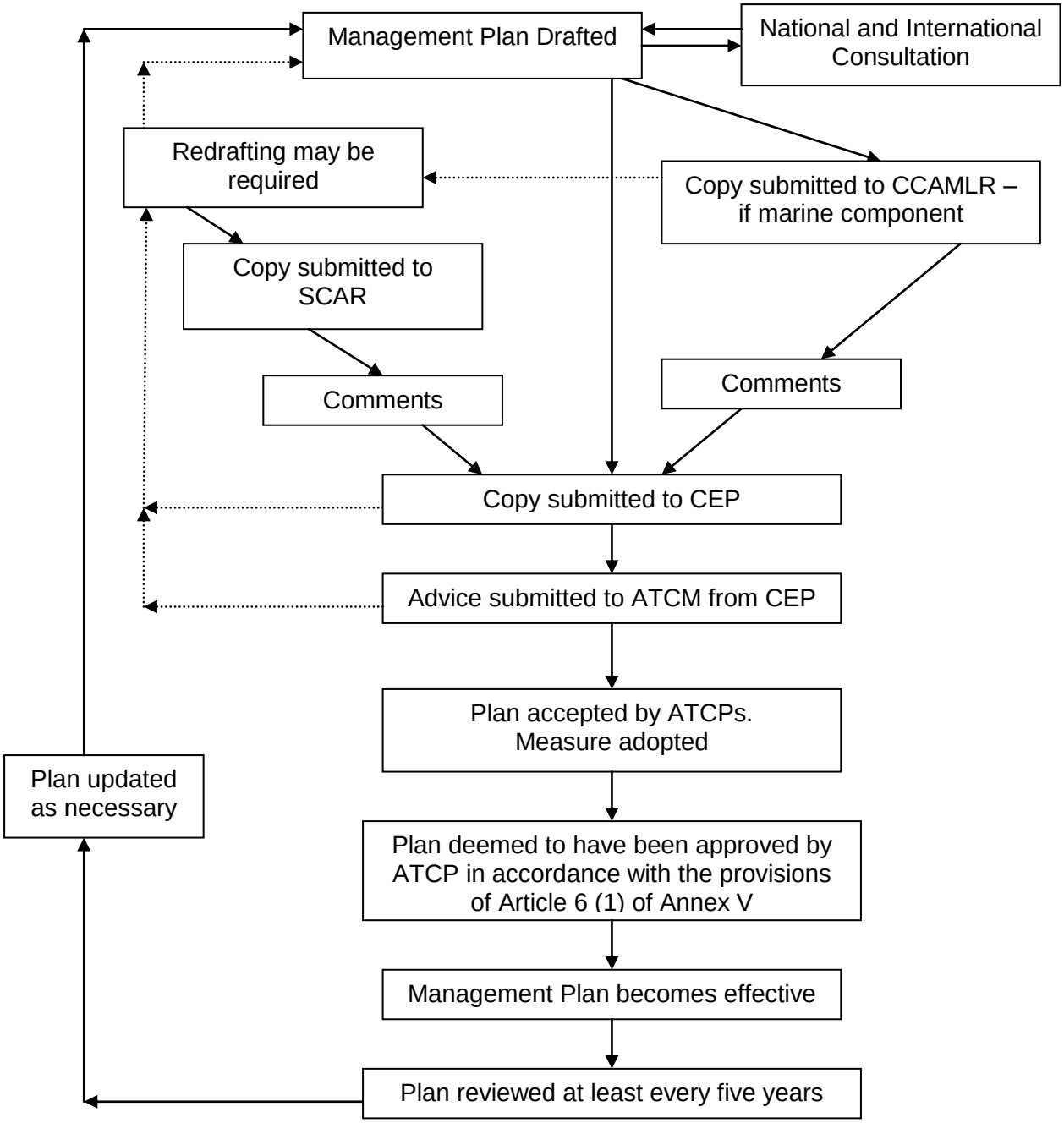
There are two forms of protection:
Antarctic Specially Protected Areas (ASPA) are designed to protect outstanding environmental, scientific, historic, aesthetic or wilderness values, a combination of these values, or ongoing or planned scientific research. A permit is required to enter an ASPA. (Article 3). ASPA provide a higher level of protection for specific values beyond that achieved by other forms of planning and management measures under the Protocol. These areas are designated within geographically defined limits and are managed to achieve specific protection aims and objectives.

Antarctic Specially Managed Areas (ASMA) are aimed at assisting in the planning and co-ordination of current or future activities, avoiding possible conflicts and improving co-operation between Parties and minimising environmental impacts. A permit is not required to enter an ASMA. (Article 4)

There is also an official list of **Historic Sites and Monuments (HSM)** established in 1972. The purpose of the list is to preserve and protect these sites from damage and destruction. Some HSM are also ASPA or form a part of ASPA. There are guidelines for designation and protection of HSM.
http://www.ats.aq/documents/cep/Guidelines_HSM_V2_2009_e.pdf. HSM only have management plans when they are also designated as ASPA or ASMA.

2.2.2 Procedures for establishment

On recommendation by the Committee for Environmental Protection (CEP), and with the submission of a working paper including a management plan for the proposed ASPA by a Party, the Antarctic Treaty Consultative Meeting (ATCM) must form a consensus in order to establish an ASPA. Article 6 of Annex V outlines the designation procedures. A Management Plan for an ASPA requires the agreement of all Parties at an ATCM so the process of approval of the Management Plan is given in detail.



Approval process for ASPA Management Plans

2.2.3 Guidance with implementation

The ATCM has adopted guidelines to assist Parties in selecting sites for designation. http://www.ats.aq/documents/recatt/Att081_e.pdf. The aim of the guidelines is to assist the Parties, Scientific Committee on Antarctic Research (SCAR), Commission for the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), Council of Managers of National Antarctic Programmes (COMNAP) and the CEP to apply Article 3 of Annex V. The guidelines are organised into three main parts representing a process for assessing, selecting, defining and proposing new protected areas.

The checklist for assessing a site (Part II) provides guidance on the values to be protected and on how to determine what should be protected and why; the concept of quality, including quality criteria; and the concept of environmental risk. Part III of the guidelines provides guidance for defining areas for protection including ways to apply the concept of feasibility.

2.2.4 Protection mechanisms available

Article 5 of Annex V outlines very specific requirements for Management Plans. The ATCM has adopted guidelines to assist Parties in preparing management plans but the guidelines have no legal status.
http://www.ats.aq/documents/recatt/Att082_e.pdf

Management Plans must describe the values of an area; define the aims and objectives, management activities and area; decide on a period of designation; identify any zones within the area in which activities are to be prohibited, restricted or managed; and provide appropriate maps and photographs.

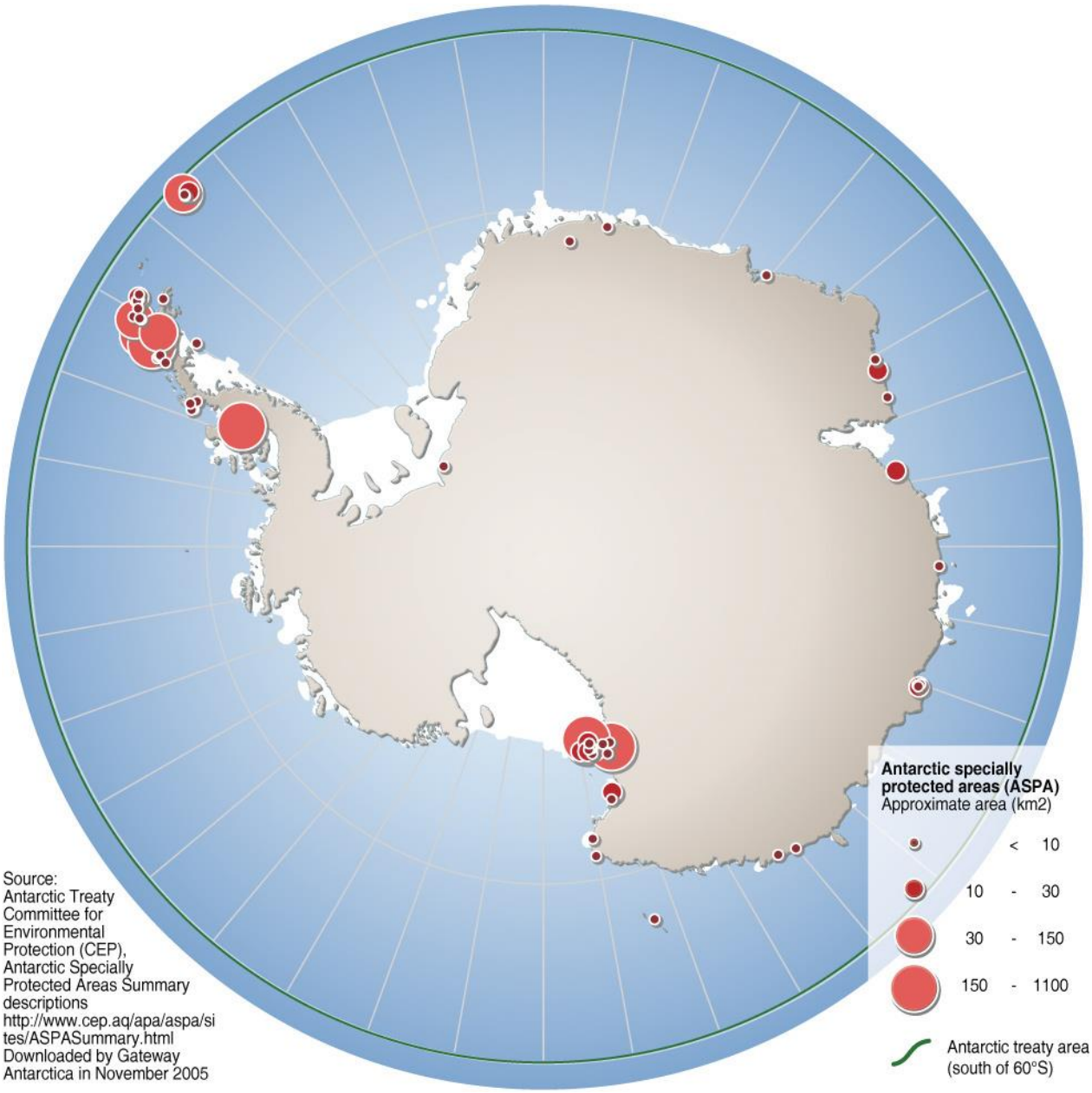
Annex V Article 7 establishes authority with each Party to issue permits as a condition for entry into the ASPA. Included with the permit are specific sections of the Management Plan that enable visitors to focus on protecting the area as intended.

2.2.5 Monitoring and reporting

The permitting requirement gives the issuing party the ability to monitor and manage access into the ASPA. Article 10 instructs Parties to collect information about current ASPA, including site inspections, and share that information through the CEP with the other Parties yearly.

2.2.6 ASPA currently in place

- There are 71 ASPA
- Most sites are in the Ross Sea region and on the Antarctic Peninsula
- Range in size from 0.25ha to 1021km^2
- Total area 3775km^2, 0.03% of the total area of Antarctica
- The values protected are predominantly environmental (61) and scientific (52), with only 9 with historic values, 4 aesthetic and 2 wilderness
- There are only two ASPA classified as marine. They are the two largest ASPA and are both near-shore areas. There are no open-ocean ASPA.



ASPA locations

Refer to Appendix 2 for a detailed analysis of existing ASPA based on the values to be protected.

3 ASSESSMENT OF CURRENT ASPA (ARE THE ASPA WORKING?)

3.1 Individual areas

3.1.1 Historic ASPA

The key to assessing whether ASPA are serving the Antarctic well in terms of protecting sites of historic value, is in comparing ASPA management to the management of stand-alone Historic Sites and Monuments (HSM).

All Historic ASPA have Management Plans that detail the protection and preservation of the values contained in the area. The Management Plans set out strict rules for accessing the area and for the control of activities that may occur in the area. The Management Plans also spell out any restoration work that is required to maintain or preserve the historic values of the area. There are a total of 9 HSM which fall under this category and are incorporated within ASPA.

Simply put, HSM that are located within ASPA are cared for and protected by the personnel of the base nearest to it.[1] This is evident from the following pictures of the pristine state of Cape Evans Hut and Mawson's Hut which are located within ASPA. It is fair to suggest that New Zealand's commitment to the preservation of Captain Scott's Hut at Cape Evans (through the Antarctic Heritage Trust) is impeccable. The importance of Scott's expedition is deeply grounded in the national psyche. Therefore, it will be well cared for given its importance to New Zealanders.

Terra Nova Hut, Cape Evans

[1] In the majority of cases the HSM was nominated by the Party whose base is closest to it. This means the Party has a vested interest in caring for their own HSM.

In contrast, the 75 stand-alone HSM do not require management plans. These sites lack management direction and as a result they tend to be in various states of disrepair as evidenced by the following photo:

Tags and graffiti in Argentine HSM

A two-tier system of importance has therefore developed in HSM management. HSM within ASPA are universally seen as important and accepted by all nations as deserving proper management and protection. Conversely, many stand-alone HSM are seen as being of little importance and the reason for their designation spurious.

The procedures for and history of HSM designation in Antarctica therefore need further scrutiny. In accordance with Article 8, Annex V any Party may propose a site or monument of recognised historic value which has not been designated as an ASPA or an ASMA, or which is not located within such an Area, for listing as a HSM.[2]

Effectively this means that any nation can propose anything it wants as an HSM. As a result there is a wide divergence in things that have been proposed as HSM. For example, sixteen HSM are associated with the Heroic Age of Exploration. On the other hand, two HSM commemorate national heroes completely unconnected to Antarctica and no reason at all is stated for the establishment of three HSM.

The fact that any nation can propose anything as an HSM opens up the possibility of a proliferation of HSM and this in turn raises the fear that HSM designation could be

[2] The ATCM developed Guidelines for the designation and protection of Historic Sites and Monuments in 2009 to assist Parties with this task. ATCM Resolution 3, 17 April 2009, ATCM XXXII.

seen as a tactical ploy in nations seeking a rationale for Antarctic sovereignty claims in any future land grab.

A closer examination of what is considered as worthy of historical commemoration by different countries will show the wide divergence that exists in HSM. Three examples of HSM that show a huge divergence in relative merit and emphasise the potential problem of nations declaring HSM to reinforce possible future sovereignty claims are as follows:

- HSM #16 – Cape Evans Hut, Ross Island. Built in January 1911 by the British Antarctic Expedition of 1910-1913, led by Captain Robert Falcon Scott. Restored in 1961 by the Antarctic Division of New Zealand Department of Scientific and Industrial Research. Proposed by New Zealand/UK.

- HSM # 11 – A heavy tractor at Vostok station with a plaque in memory of the opening of the station in1957. Proposed by the Soviet Union.

- HSM # 30 – A shelter at Paradise Harbour erected in 1950 near the Chilean Base to honour President Videla, the first head of state to visit Antarctica. The shelter is described as a representative example of pre-IGY activity and constitutes an important national commemoration. Proposed by Chile.

The historic relevance and importance of a shelter built in 1950 for a visiting politician or a heavy tractor must be questioned. It is likely at best that these HSM will be less well managed and at worst, they will become a monument to human folly and fall into degradation and disrepair.

If an HSM is proposed it should by definition be worthy of comprehensive management and protection. The Americans keep their HSM in top pristine condition. Their HSM matter in their national psyche and it shows. The Cape Evans Hut too is in pristine condition precisely because it is considered as valuable and important. It has therefore been designated as an ASPA.

The conclusion from our analysis is that historic ASPA are operating effectively and therefore they are serving the Antarctic well in terms of the areas protected.

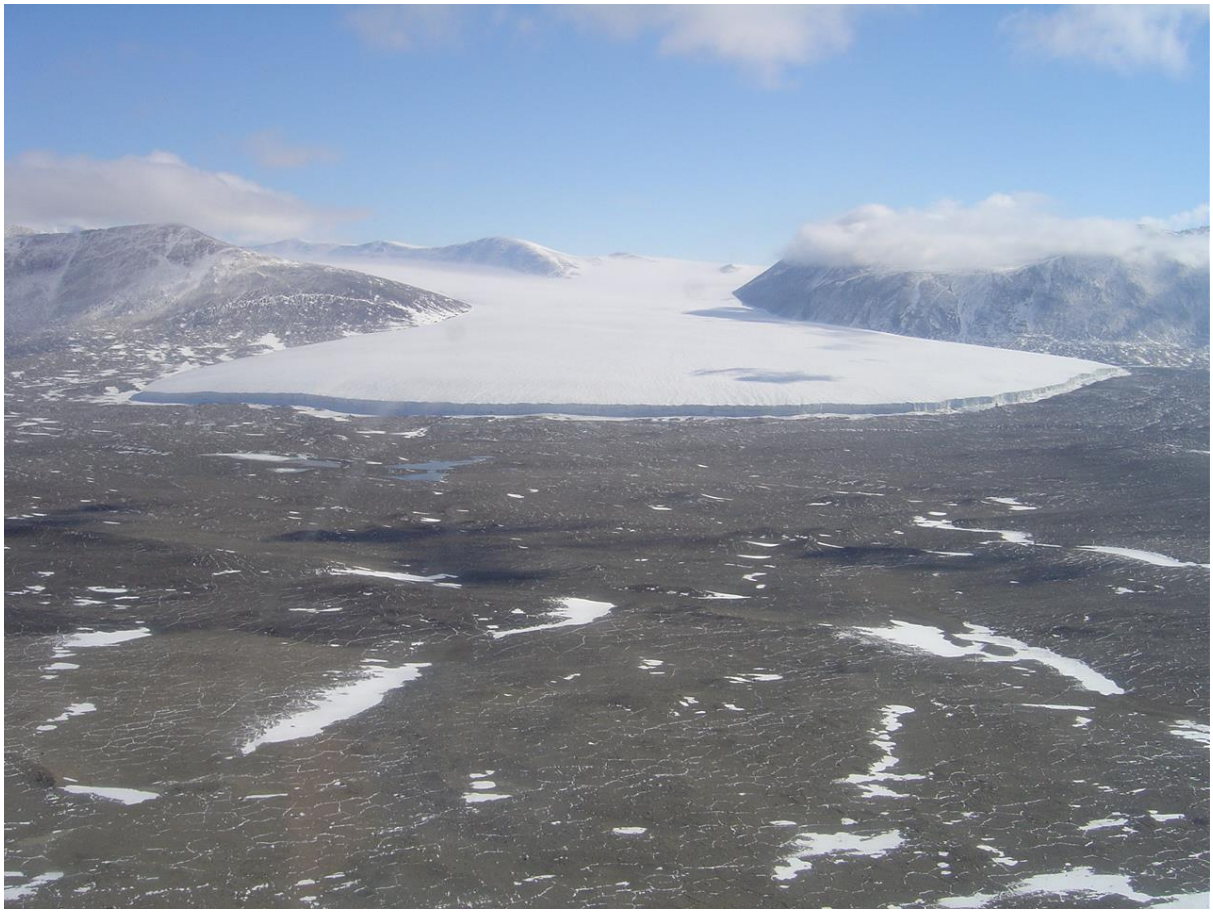
3.1.2 Environmental ASPA

Environmental ASPA are established to protect physical, ecological or biological features that are particularly unique or representative of the Antarctic environment. To determine whether environmental ASPA are serving the Antarctic well, assessments were conducted on a number of ASPA Management Plans and this management approach was also then compared to management undertaken within Antarctic Specially Managed Areas (ASMA). The following environmental ASPA Management Plans were assessed:

- ASPA 131 – Canada Glacier (Taylor Valley, Victoria Land) – As stated in Appendix 3 the Canada Glacier ASPA was established to protect the “exceptional intrinsic ecological value” of the area.

- ASPA 124 – Cape Crozier (Ross Island) – The Cape Crozier ASPA was established to protect the “rich bird and mammal fauna as well as the microfauna and microflora” of the area.
- ASPA 104 – Sabrina Island (Balleny Islands) – The Sabrina Island ASPA was established to protect the “fauna and flora which represent many circumpolar distributions at this latitude” and a representative example of the Balleny Islands.

Assessments of the Management Plans for these ASPA are set out in Appendix 3. These assessments show that ASPA management is conducted in accordance with a ‘preservationist’ philosophy. The Management Plans heavily restrict access into the areas and the scientific activities (and educational activities in the case of Cape Crozier – which are associated with the historic sites) which are permitted to be carried out in these ASPA are tightly managed to ensure the preservation of the flora and fauna that the areas were established to protect. Management of the ASPA, as set out in the Management Plans, will protect the values of the sites against the ‘direct’ human-induced risks.



Canada Glacier

The global, indirect risks of climate change cannot be managed through the ASPA Management Plans *per se*. However, a precautionary approach is being taken to ensure the ASPA areas are broad enough (they have an appropriate ‘buffer’ surrounding the values to be protected) to cope with habitat or ecosystem shifts that may occur in response to climate change within the 5-year review term for the ASPA.

The conclusion therefore is that environmental ASPA are operating effectively and therefore they are serving the Antarctic well in terms of the areas protected.

Management of ASMA as a comparison

In comparison to environmental ASPA (which are managed to 'preserve' the environmental values within the area they are established over), ASMA such as ASMA 2 (McMurdo Dry Valleys), are designed to 'conserve' the area they are established over by managing[3] the cumulative impacts of the multiple and intensive activities that occur there. Zoning is a key management method used to plan and co-ordinate the intensive activities in the ASMA (the zones in ASMA 2 include facilities, tourism and special zones) whilst conserving the values of the area. No permit is required to enter as ASMA.

The facilities zones are established to contain facilities within a pre-prescribed area to control their distribution. The tourism zone in ASMA 2 is located in an area near the Canada Glacier where access is easy. The zone was located to ensure the impacts on science activities and the environment are minimised.[4] Special zones are designated over areas with particularly high scientific value, which are particular sensitive to human disturbance.[5]

The codes of conduct utilised within ASMA allow far more liberal access to and activities within the area than can be conducted within an ASPA. ASMA and ASPA are therefore significantly different[6] both in terms of the philosophies of management and in the intensity and type of activities that are allowed to occur within them. The permit-only access within ASPA allows for the strict management of activities. This sets ASPA apart and ensures the tightest controls possible are afforded in order to preserve the values of the area.

In terms of their respective functions and management philosophies, it can be said though that both tools are serving the Antarctic well.

3.1.3 Scientific ASPA

Scientific ASPA are established to protect physical, chemical or biological features of special interest to scientific researchers. A number of ASPA have been established to protect scientific values. Among these are Cape Crozier (ASPA 124), Barwick Valley (ASPA 123), and Arrival Heights (ASPA 122).

Cape Crozier was originally established to ensure long term studies of emperor and Adélie penguins could continue without interference. The Management Plan for the Cape Crozier ASPA indicates that management is conducted in accordance with a 'preservationist' philosophy. The Management Plan restricts access into the area and the scientific activities (and educational activities – which are associated with the historic sites) which are permitted to be carried out in the ASPA are tightly managed

[3] Through a code of conduct
[4] However, Tejedo, Justel, Rico, Benayas & Quesada (2005) and Tejedo, et al., (2009) state, that even low human activity can affect soil surface layers.
[5] It is unknown why these areas do not warrant ASPA designation status.
[6] Although ASMA are similar to ASPA established to protect ongoing or planned scientific activity.

(including restrictions on helicopter landings, importation of biota and instructions to avoid interfering with plant and animal life except when Permitted) to ensure the preservation of the flora and fauna that the area was established to protect.

Barwick Valley was designated an ASPA as a control area to which other parts of the McMurdo Dry Valleys region could be compared. This is due to it being the least disturbed of the dry valleys. According to the Management Plan "Some of the best examples of ventifact pavements and weathering-pitted dolerites are found on the valley floors, along with examples of chasmolithic lichens, layered communities of endolithic lichens, fungi, algae and associated bacteria, and populations of soil and lake microflora. Special protection of the Area provides the opportunity to conserve a relatively pristine example of this ecosystem as a baseline for future reference." The Management Plan allows for scientific activity only when it is for compelling reasons and when it is not possible to do the science elsewhere.[7] It also seeks to minimize sampling and minimize the risk of introducing alien species.

Arrival Heights is one of only three ASPA to be protected solely for scientific values. The others are Dakshin Gangotri Glacier (ASPA 163) in Dronning Maud Land and Rothera Point (ASPA 129), Adelaida Island. Arrival Heights was designated an ASPA because it is an "electromagnetically quiet" area, lending itself useful for performing signal analysis and atmospheric research. According to the Management Plan "While it is now recognised that the electromagnetically 'quiet' conditions have to some degree been degraded by base operation and radio communication activities adjacent on the Hut Point Peninsula, the nature, magnitude and extent of these transmissions is such that the original values for which the site was designated are still considered worthy of protection."

Arrival Heights

[7] American geologists went in and surveyed the area. Yvonne Cook, PCAS Course Co-ordinator, personal communication, 17 December 2009.

It is considered that the ASPA status is critical for protecting the scientific values of the area.[8]

Furthermore, the Management Plan states: "It is recognised that the values of the Area as an electromagnetically 'quiet' site are at risk from broad and narrow band electromagnetic interference…the current preferred option for management is to minimize both internal and external sources of electromagnetic interference to the maximum extent practicable, and to monitor these levels routinely so that any significant threat to the values of the site can be identified and addressed as appropriate."

There is anecdotal evidence that the Crater Hill windfarm may be interfering with the scientific values of this ASPA.[9] However, there is currently no empirical data that demonstrates the windfarm is interfering with the science being conducted at Arrival Heights. The low frequency activity that is detected from the turbines is currently being omitted from analyses as an outlier (just like the disturbance from McMurdo and communication activities generally).

As with the environmental ASPA, the global, indirect risks of climate change cannot be managed through the scientific ASPA Management Plans *per se*. However, a precautionary approach is being taken to ensure the ASPA areas are broad enough (they have an appropriate 'buffer' surrounding the values to be protected) to cope with habitat or ecosystem shifts that may occur in response to climate change within the 5-year review term for the ASPA.

Our analysis suggests that the management of these ASPA, as set out in the Management Plans, will protect the values of the site against the 'direct' human-induced risks that have been identified. The conclusion therefore is that scientific ASPA are operating effectively and therefore they are serving the Antarctic well in terms of the areas protected.

3.1.4 Wilderness and aesthetic ASPA

Wilderness and aesthetic ASPA are established to protect features or characteristics (eg, remoteness, beauty, absence of human-made objects) that contributes to people's appreciation of Antarctica. Given there are so few of these ASPA established no assessment was made of these types of ASPA.

3.2 Comprehensive network of protection

3.2.1 Requirements

Article 3(2) requires Parties to take a systematic framework approach to identify and include the following areas in a series of ASPA:

(a) Environmental areas – areas kept inviolate from human interference, representative examples of major terrestrial and marine ecosystems, areas with

[8] Margaret Auger, Science Technician for Antarctica New Zealand, personal communication, 30 December 2009.
[9] Yvonne Cook, PCAS Course Co-ordinator, personal communications, 17 December 2009.

important or unusual assemblages of species, the type locality or only known habitat of any species (rare, distinct, unique ecological areas) and examples of outstanding geological, glaciological and geomorphological features.

(b) Scientific areas – areas kept inviolate from human interference so that future comparisons can be made with localities that have been affected by human activities and areas of particular interest to ongoing or planned scientific research.

(c) Historic areas – sites or monuments of recognised historic value.

(d) Wilderness and aesthetic areas – areas of outstanding aesthetic or wilderness value.

As such Article 3(2) places a heavy emphasis on protecting areas of environmental value.

3.2.2 What work has been done on the systematic framework approach?

To date, proposed ASPA Management Plans have been lodged with the CEP by Parties as and when values are identified that they feel are worthy of protection. ASPA tend to be established adjacent to or within the immediate vicinity of permanent or seasonal bases or campsites as a result of the scientific investigations conducted in these areas. This 'ad hoc' approach to ASPA implementation (rather than the co-ordinated, systematic framework approach to identifying and establishing ASPA as required by Article 3(2)) leads to the disconnected set of ASPA that are currently in place around the Antarctic Continent and the sprinkling of ASPA that exist in the surrounding marine environment south of 60^{o} South Latitude.

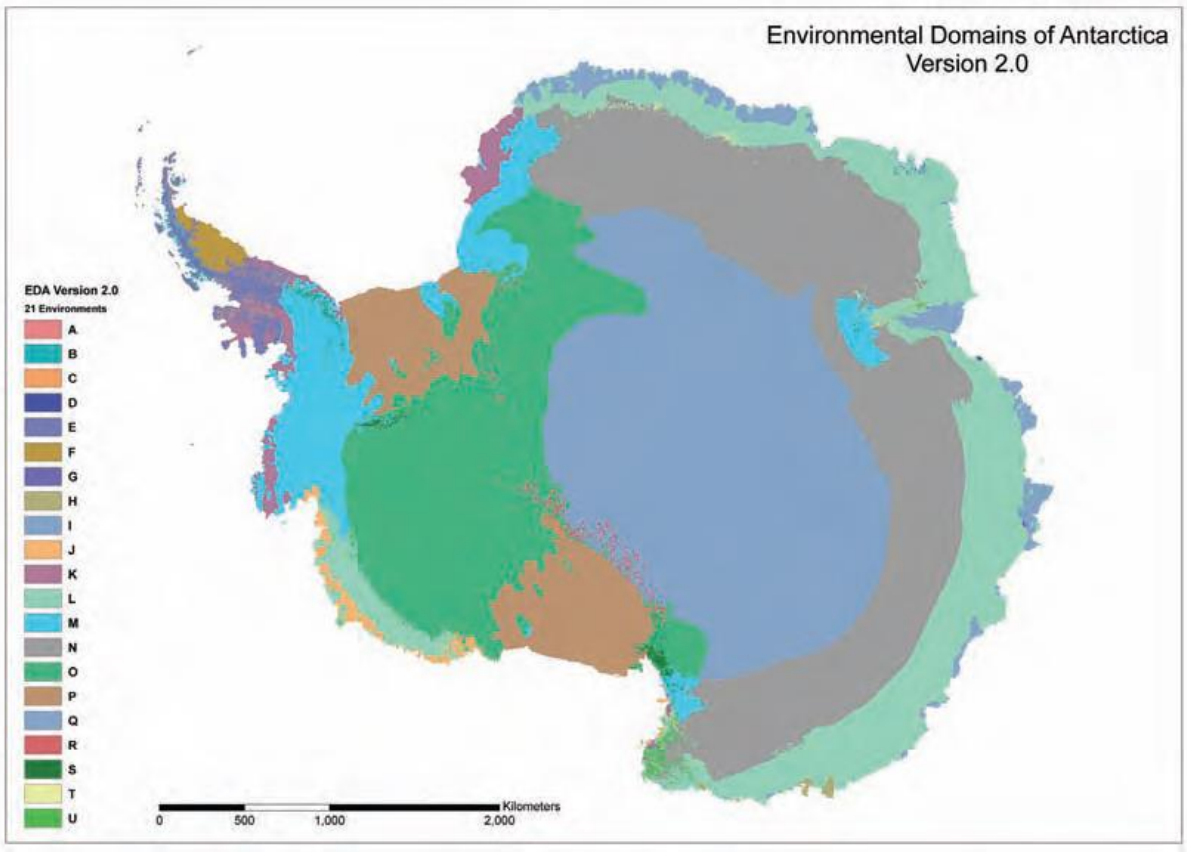
However, in recent years the CEP, ATCM and CCAMLR have begun to develop tools to move away from this ad hoc approach. A number of classification tools have been compiled that will assist with the identification of environmental and wilderness and aesthetic ASPA. These tools include:

(a) Environmental domains analysis

Landcare Research, a New Zealand Crown Research Institute, completed an Environmental Domains Analysis under contract to Antarctica New Zealand and the Department of Conservation in 2007. The result of this research was the identification of 21 distinct environmental domains in Antarctica based on underlying measurable physical characteristics including climate, slope, land cover and geological features. The Environmental Domains Analysis is currently on file with the Committee for Environmental Protection. While currently unused for environmental protection, these domains provide a systematic approach for establishing protected areas to ensure a representative cross section of all environment types in Antarctica are covered by ASPA (Morgan, Barker, Briggs, Price and Keys, 2007).

The establishment of a control reserve has been accomplished by ASPA 123 at Barwick and Balham Valleys in the McMurdo Dry Valleys. The conservation of one ASPA to be used as a control for monitoring changes in other areas against a baseline

fits well with the idea of using the Environmental Domains Analysis to systematically identify and subsequently protect representative samples of different physical Antarctic environments.



Antarctic Environmental Domains (Landcare Research).[10]

(b) Bioregionalisation in the marine environment

Under its overarching goal of conserving and rational use of marine living resources, CCAMLR[11] has set out two main overarching objectives for the establishment of Marine Protected Areas (MPA):

1. The conservation of biodiversity and
2. The maintenance of ecosystem function.

The types of MPA that can be established under this mandate include:
(i) Representative areas
(ii) Vulnerable areas
(iii) Scientific areas
(iv) Areas where important ecosystem processes occur.

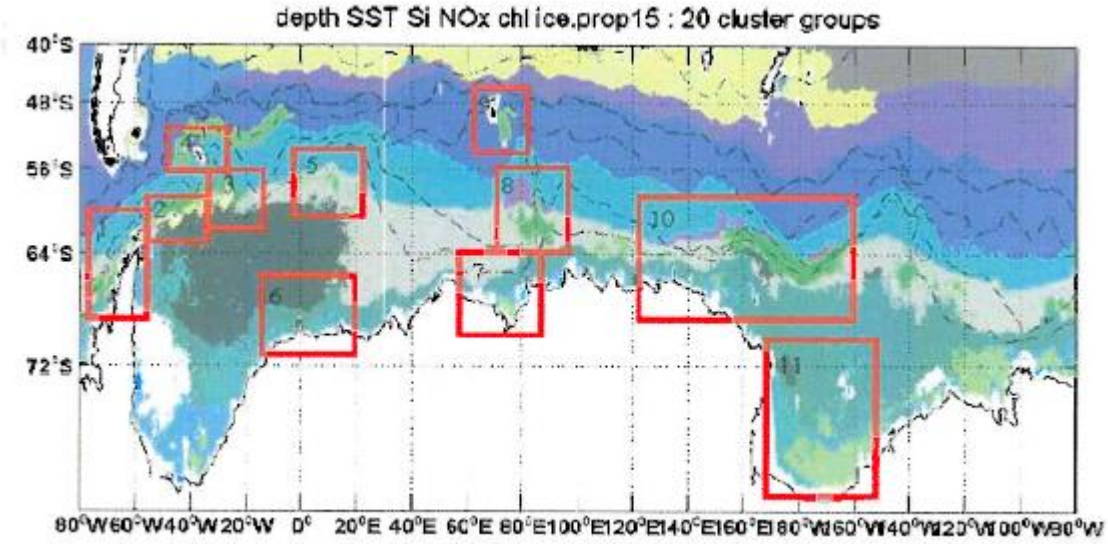
[10] Refer to Appendix 4 for the domain labels.
[11] The convention is given effect to in New Zealand by the Antarctica (Marine Living Resources) Act 1981.

Additional objectives considered by CCAMLR as required by Annex V of the Protocol include:

(i) The protection of unique, rare and highly biodiverse areas,
(ii) The protection of critical life history stages,
(iii) Increasing resilience to climate change
(iv) Areas kept inviolate from human disturbance and
(v) Multiple use areas to co-ordinate activities (much like the ASPA for ongoing or planned scientific activity).

Since 2005 CCAMLR has been working on the development of a marine environmental classification system as the framework to co-ordinate the identification and establishment of MPA south of the Antarctic Convergence. A number of workshops have been held to gather and assess the best available physical and biological data on the Southern Ocean in order to identify broad biogeographic regions south of the Antarctica Convergence. This work has been termed 'bioregionalisation'.

The Bioregionalisation Workshop in 2007 agreed on a set of bioregions that were identified from an analysis of a number of Southern Ocean characteristics including depth, sea surface temperature, silicate concentration, nitrate concentration, surface chlorophyll-a and ice concentration. The highest heterogeneous areas were then identified by the Workshop as the priority regions for identifying MPAs in order to conserve key fisheries areas in the Southern Ocean from overexploitation and to establish a comprehensive and representative network of marine protection. Two of the eleven priority areas identified are within the Ross Sea region.



Southern Ocean Bioregionalisation with CCAMLR priority areas identified.

(c) Historic classification work

No classification work has been conducted in relation to this value directly, although, the identification of 84 HSM throughout the continent is a starting point for a classification system.

(d) Scientific classification work

No classification work has been conducted in relation to this value directly, although, the environmental domains analysis and bioregionalisation work may assist with identifying areas of scientific value.

3.2.3 Current protection networks

(a) Historic network

There are only nine historic ASPA in place and therefore the network is largely non-existent. The conclusion from our analysis is that, because there is not a comprehensive network of protection established, collectively, historic ASPA are not serving the Antarctic well.

(b) Environmental network

Despite the requirements set out in Article 3(2) and the guidance provided by the CEP, ATCM and CCAMLR, the 'ad hoc' approach to ASPA implementation referred to above has led to the isolated and fragmented set of environmental ASPA currently in place. These environmental ASPA form the beginnings of a representative network of protected ecosystems (such as ASPA 131 over the Canada Glacier – which is a small representative example of the south Victoria Land Dry Valley ecosystems associated with glaciers, and ASPA 124 over Cape Crozier – which is a representative example of the ecosystems of the Cape Crozier region), however, far more ASPA are required to achieve the appropriate level of protection necessitated by Article 3(2).

The conclusion from our analysis is that collectively, environmental ASPA are not serving the Antarctic well. The current environmental protection network does not contain representative examples of all terrestrial and marine ecosystems, nor does it contain the full breadth of areas kept inviolate from human interference, areas with important or unusual assemblages of species, the type locality or only known habitat of any species (rare, distinct, unique ecological areas[12]) and examples of outstanding geological, glaciological and geomorphological features.

(c) Scientific network

The scientific ASPA that are currently in place are largely areas adjacent to or within the immediate vicinity of permanent or seasonal bases or campsites. These ASPA form the isolated and fragmented beginnings of a network, but at this time our analysis concludes that collectively, scientific ASPA are not serving the Antarctic well.

(d) Wilderness and aesthetic network

There are only six wilderness and aesthetic ASPA in place and therefore the network is largely non-existent. Therefore the conclusion from our analysis is that collectively, wilderness and aesthetic ASPA are not serving the Antarctic well.

[12] Lewis Smith (2005).

4 DISCUSSION – OVERCOMING ISSUES/GAPS/SHORTCOMINGS

4.1 Individual areas

As stated in sub-sections 3.1 of the report, the current management of existing ASPA is serving the Antarctic well in terms of the individual areas protected.

However, Parties must continue to monitor ASPA in order to detect changes in the values to be protected, including changes arising from the effects of global climate change. Although the impacts of climate change cannot be managed directly through the ASPA management plans *per se*, ASPA managers must ensure the ASPA area is broad enough (has an appropriate 'buffer' surrounding the values to be protected) to cope with habitat or ecosystem shifts that may occur in response to climate change within the 5-year review term for the ASPA. This may require alterations to be made to the design of the protected area, such as size, location or boundary shape.

The CEP and ATCM may assist ASPA managers to preserve the values to be protected within ASPA in future also by setting minimum protection standards/guidelines that need to be reflected in all revised management plans.

Enhanced compliance and enforcement within each ASPA will also assist to improve the effectiveness of designated ASPA. This will be especially necessary within ASPA where tourism activities are increasing and in marine ASPA given the likely increase in Illegal Unregulated and Unreported (IUU) fishing in future and the increased risks of bioinvasion of alien species associated with the use of Arctic fishing vessels.[13]

4.2 Comprehensive network of protection

4.2.1 Systematic framework approach to be fully implemented

(a) Leadership

The CEP, ATCM, SCAR and CCAMLR are in the best position to provide leadership to bring this work together to facilitate the establishment of a protection network through the adoption of a precautionary approach. Effectively the CEP and CCAMLR must act as Project Managers to implement the systematic framework.

However, all Treaty Parties need to prioritise this protection work also if it is to be completed in the immediate future.

(b) Comprehensiveness

If ASPA are to function effectively for the Antarctic, much greater emphasis needs to be placed on establishing a comprehensive and representative network that includes protected ecosystems, areas kept inviolate from human interference, areas with important or unusual assemblages of species, the type locality or only known habitat of any species (rare, distinct, unique ecological areas), examples of outstanding geological, glaciological and geomorphological features, historic areas, scientific areas and outstanding aesthetic and wilderness areas.

[13] Hughes & Convey (2009); Maj De Poorter, IUCN, personal communication, 24 November 2009.

In order to establish a truly comprehensive network of protection areas, there is the need to ensure that ASPA can be established out to the Antarctic Convergence.[14] The ATCM have taken the initial steps to ensure protection, consistent with the Protocol, can be established out to Antarctic Convergence by advocating for the extension of the "Antarctic Area" Special Area out to Antarctic Convergence.[15]

(c) Network design and planning principles

Internal ATS guidance

Guidelines for the Implementation of the Framework for Protected Areas

The criteria set out in these guidelines will assist with designing and planning the establishment of a network of protection despite the fact that these guidelines are mainly focused on individual ASPA areas. The main criteria in these guidelines that can be used are:

- Representativeness – what contribution would the area make to a network? What types of values are represented in the proposed protection area?
- Diversity – what diversity does the area contain?
- Distinctiveness/ecological importance – does the area contain rare, unique species or habitats?
- Degree of interference – how intact is the area?
- Natural processes/variability and viability – Are natural processes likely to modify the area or its values?
- Area design – boundaries, size and shape and duration of protection (perpetual in the case of protected ecosystems as well as areas kept inviolate from human interference, rare, distinct, unique ecological areas and outstanding aesthetic and wilderness areas).
- Feasibility – how possible is to implement protection in the proposed area?

CCAMLR criteria/objectives for MPA establishment

The MPA to be established by CCAMLR within the eleven priority regions can be given dual status as ASPA also.[16] The criteria/objectives set by CCAMLR for the establishment of MPA will therefore assist with designing and planning the establishment of the ASPA protection network.[17] The criteria/objectives include:

- Representative areas
- Vulnerable areas
- Scientific areas
- Areas where important ecosystem processes occur

[14] The need for the establishment of marine protection tools in the 'high seas' is supported by Scovazzi (2004).
[15] ATCM Resolution 1, 17 April 2009, ATCM XXXII.
[16] The ATCM is keeping a watching brief over CCAMLR's commitment to conserving marine biodiversity and ecosystem function by establishing a network of MPA (Resolution 1, 23 June 2006 – ATCM XXIX).
[17] In particular the ASPA established to protect representative examples of ecosystems, areas kept inviolate from human interference, rare, distinct, unique ecological areas, outstanding aesthetic and wilderness areas, outstanding geological and geomorphological features and scientific areas.

- Unique, rare and highly biodiverse areas
- Critical life history stages
- Increasing resilience to climate change
- Areas kept inviolate from human disturbance
- Multiple use areas to co-ordinate activities

External guidance

Department of Conservation – Marine Protected Areas Policy[18]

The network design and planning principles set out in this policy would greatly assist the establishment of a protection network of ASPA – especially the marine component that is to be progressed with the assistance of CCAMLR. The main network design principles in this policy that can be used are:

- Completeness – the network should protect examples of the full range of ecosystems.
- Viability – a viable network will be more likely to withstand or recover from the stresses placed upon it – both natural and human-induced (whether direct or indirect). Viability can be enhanced through appropriate ASPA design (size, shape), replication and connectivity between ASPA. Where possible, ASPA should ensure the maintenance of ecosystem functionality.
- Monitoring – a monitoring programme should be undertaken to ensure that each ASPA is effective in protecting the values it has been established to safe-guard.

And the main planning principles in this policy that can be used are:

- Representativeness
- Effectiveness – the management tools used in the ASPA should be sufficient to meet the required protection standards/guidelines set by the CEP and the ATCM and they should be consistent and secure in the long-term.
- Transperancy – ASPA establishment should be undertaken in a transparent and participatory manner.
- Minimising impacts – Adverse impacts on existing users (especially fishers in the case of marine ASPA) should be minimized.
- Best available information should be used as the basis for establishing the ASPA.
- Decision making should be guided by a precautionary approach.
- The ASPA network must be enforceable – the compliance and enforcement required will be based on the likely risks of non-compliance.

[18] Department of Conservation and Ministry of Fisheries (2005).

Antarctic and Southern Ocean Coalition and the Guardians of Fiordland's Fisheries – selection criteria for MPA establishment

The MPA selection criteria developed by these two organisations would greatly assist the establishment of a protection network of marine ASPA. The key selection criteria are:

- Comprehensiveness – all known elements of biodiversity, at a range of scales, must be captured within the network.
- Adequateness – the core components of adequacy include reserve size, connectivity and replication.
- Representativeness
- Rare, unique or vulnerable habitat – establishment of 'China Shops'[19]

(d) Classification

Environmental domains analysis

The Environmental Domains Analysis is based on physical characteristics of areas in Antarctica. In order to properly use this tool to systematically identify unique ecosystems in the Antarctic environment, biological information should be incorporated within the model used to define ecological domains. The Scientific Committee on Antarctic Research (SCAR), a group of experts on Antarctic science, can complete the biological equivalent of the work done by the Environmental Domains Analysis and combine this information in a new model that can denote all types of ecosystems based on both physical and biological characteristics within Antarctica so a network of representative samples of each type of ecosystem can be protected.

Bioregionalisation

The detailed classification work within each of the eleven priority bioregions must be completed in order to identify MPA (marine ASPA) that will establish a comprehensive and representative network of protected ecosystems as well as areas kept inviolate from human interference, areas with important or unusual assemblages of species, the type locality or only known habitat of any species (rare, distinct, unique ecological areas), examples of outstanding geological and geomorphological features and outstanding aesthetic and wilderness areas.

New Zealand is finalising the fine-scale classification of the Ross Sea bioregion that is required to identify MPA proposals to be tabled with CCAMLR in the near future.[20]

[19] Fragile habitat such as corals that require special protection. Antarctic and Southern Ocean Coalition (2009a); Antarctic and Southern Ocean Coalition (2009b); Guardians of Fiordland's Fisheries & Marine Environment (2003).

[20] The progress to date on identifying MPA for the Ross Sea area was tabled with CCAMLR, in November 2009, as an Information Paper. It is hoped that the MPA proposals for the Ross Sea will be tabled with CCAMLR in October 2010 – Trevor Hughes, Ministry of Foreign Affairs and Trade, personal communication, 15 December 2009.

Classification of areas with historic and scientific values

The ATCM (through the use of an Antarctic Treaty Meeting of Experts – ATME) should facilitate the classification of areas of 'recognised' historic and scientific value south of Antarctic Convergence. The HSM could provide a baseline for this work on historic values.

(e) Protection standards/guidelines developed

The CEP and the ATCM should set minimum protection standards/guidelines for the protection of each value – much like those that have been written for MPA around New Zealand (Ministry of Fisheries and Department of Conservation, 2008). For example, this could mean that some fishing may be allowed within a marine ASPA, provided the level of fishing was appropriately restricted to meet the desired standard or level of protection.

(f) Inventory of existing protection for each value

The CEP and ATME should facilitate the identification of the current network of ASPA that exist for each of the four values.

(g) Identify the gaps in the network for each value

The CEP and ATME should then facilitate the identification of any gaps in the network for each of the four values.

(h) Area identification to fill these gaps

Environmental, wilderness and aesthetic areas

The CEP and ATME should facilitate the identification of the priority environmental, wilderness and aesthetic areas for protection[21] in order to establish a comprehensive and representative network of protected terrestrial and marine ecosystems (south of the Antarctic Convergence), areas kept inviolate from human interference, areas with important or unusual assemblages of species, the type locality or only known habitat of any species (rare, distinct, unique ecological areas), examples of outstanding geological, glaciological and geomorphological features and outstanding aesthetic and wilderness areas. Parties should also continually look to identify and establish ASPA over areas with important or unusual assemblages of species, the type locality or only known habitat of any species (rare, distinct, unique ecological areas).

These new ASPA could encompass large areas of the Antarctic, but possibly not to the extent advocated by Paul Broady at our public lecture on the 21st of January.

Historic and scientific areas

The ATME should facilitate the identification of the priority historic and scientific areas for protection in order to establish a network of historic and scientific ASPA. Parties

[21] Areas that can be immediately identified.

should also continually look to identify and establish historic and scientific ASPA beyond that established through the initial ATME process.

(i) Development and submission of proposed Management Plans to the ATCM

The CEP should facilitate the adoption of each proposed ASPA with an individual Party or collection of Parties (as appropriate). The Party or Parties primarily responsible for managing each ASPA should then develop the proposed management plans for each new ASPA identified and submit these to the ATCM (through the CEP) for approval. The existing guidance for preparing and assessing management plans[22] will assist as will any new guidance on protection standards drafted by the CEP and approved by the ATCM.

Proposed marine ASPA, in areas where there is actual harvesting or potential capability of harvesting of marine living resources, will be tabled with CCAMLR for prior approval before the CEP lodges the proposed Management Plan(s) with the ATCM (pursuant to Article 6(2) of Annex V).[23]

(j) Compliance and enforcement

The Party or Parties primarily responsible for managing each ASPA should conduct the necessary compliance and enforcement operations to protect the ASPA they proposed. This will be particularly necessary with regard to ASPA where tourism activities are increasing and in marine ASPA given the likely increase in IUU fishing in future and the increased risks of bioinvasion of alien species associated with the use of Arctic fishing vessels.

(k) Monitoring and reporting

The Party or Parties primarily responsible for managing each ASPA should conduct appropriate monitoring, as is currently undertaken, of their ASPA and report on this monitoring to the ATCM.

(l) Review/revision

The Party or Parties primarily responsible for managing each ASPA should commit to the ongoing review and revision of the Management Plans (as currently undertaken) for their ASPA as appropriate and submit these revised Management Plans to the ATCM (through the CEP). Given the heavy increase in work that will result from the considerable increase in the number of ASPA, consideration should be given to extending the ASPA review period out from 5 years to a 10 year period.

[22] Guide for the Preparation of ASPA Management Plans and Guidelines for CEP Consideration of New and Revised Draft ASPA and ASMA Management Plans.
[23] ATCM Decision 9, 17 June 2005, ATCM XXVIII.

5 CONCLUSIONS

Our first conclusion is that individual ASPA are operating effectively for the values to be protected in the sites where they are established. For these individual sites ASPA are serving the Antarctic well.

The second conclusion from our analysis is that collectively ASPA are not serving the Antarctic well in terms of representative and comprehensive networks.

We suggest that to achieve the systematic framework of a series of ASPA as specified in Article 3(2) that the CEP, CCAMLR and the ACTM need to provide more leadership. Using existing analyses (e.g. the Environmental Domains Analysis) as a base it should be possible to define a system so that a network of representative areas could be protected. If this work was completed existing guidelines and processes could be expanded so that Parties would be able prioritise the designation of new ASPA.

Tasks that need to be undertaken to establish protection networks for the different values include:

- Complete classification work;
- Set protection standards;
- Compile an inventory of existing protection;
- Identify gaps in the network;
- Identify areas to fill these gaps;
- Draft Management Plans drafted and submit to the ATCM;
- Increase compliance and enforcement activities;
- Improve monitoring and reporting; and
- Ensure Parties commit to ongoing review/revision of ASPA

6 REFERENCES

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7 APPENDICES

Appendix 1 – Annex V to the Protocol on Environmental Protection to the Antarctic Treaty. Area Protection and Management

ARTICLE 1
DEFINITIONS

For the purposes of this Annex:
(a) "appropriate authority" means any person or agency authorised by a Party to issue permits under this Annex;
(b) "permit" means a formal permission in writing issued by an appropriate authority;
(c) "Management Plan" means a plan to manage the activities and protect the special value or values in an Antarctic Specially Protected Area or an Antarctic Specially Managed Area.

ARTICLE 2
OBJECTIVES

For the purposes set out in this Annex, any area, including any marine area, may be designated as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area. Activities in those Areas shall be prohibited, restricted or managed in accordance with Management Plans adopted under the provisions of this Annex.

ARTICLE 3
ANTARCTIC SPECIALLY PROTECTED AREAS

1. Any area, including any marine area, may be designated as an Antarctic Specially Protected Area to protect outstanding environmental, scientific, historic, aesthetic or wilderness values, any combination of those values, or ongoing or planned scientific research.

2. Parties shall seek to identify, within a systematic environmental-geographical framework, and to include in the series of Antarctic Specially Protected Areas:
(a) areas kept inviolate from human interference so that future comparisons may be possible with localities that have been affected by human activities;
(b) representative examples of major terrestrial, including glacial and aquatic, ecosystems and marine ecosystems;
(c) areas with important or unusual assemblages of species, including major colonies of breeding native birds or mammals;
(d) the type locality or only known habitat of any species;
(e) areas of particular interest to ongoing or planned scientific research;
(f) examples of outstanding geological, glaciological or geomorphological features;
(g) areas of outstanding aesthetic and wilderness value;
(h) sites or monuments of recognised historic value; and
(i) such other areas as may be appropriate to protect the values set out in paragraph 1 above.

3. Specially Protected Areas and Sites of Special Scientific Interest designated as such by past Antarctic Treaty Consultative Meetings are hereby designated as Antarctic Specially Protected Areas and shall be renamed and renumbered accordingly.

4. Entry into an Antarctic Specially Protected Area shall be prohibited except in accordance with a permit issued under Article 7.

ARTICLE 4
ANTARCTIC SPECIALLY MANAGED AREAS

1. Any area, including any marine area, where activities are being conducted or may in the future be conducted, may be designated as an Antarctic Specially Managed Area to assist in the planning and co-ordination of activities, avoid possible conflicts, improve cooperation between Parties or minimise environmental impacts.

2. Antarctic Specially Managed Areas may include:
(a) areas where activities pose risks of mutual interference or cumulative environmental impacts; and
(b) sites or monuments of recognised historic value.

3. Entry into an Antarctic Specially Managed Area shall not require a permit.

4. Notwithstanding paragraph 3 above, an Antarctic Specially Managed Area may contain one or more Antarctic Specially Protected Areas, entry into which shall be prohibited except in accordance with a permit issued under Article 7.

ARTICLE 5
MANAGEMENT PLANS

1. Any Party, the Committee, the Scientific Committee for Antarctic Research or the Commission for the Conservation of Antarctic Marine Living Resources may propose an area for designation as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area by submitting a proposed Management Plan to the Antarctic Treaty Consultative Meeting.

2. The area proposed for designation shall be of sufficient size to protect the values for which the special protection or management is required.

3. ***Proposed Management Plans*** shall include, as appropriate:
(a) a description of the value or values for which special protection or management is required;
(b) a statement of the aims and objectives of the Management Plan for the protection or management of those values;
(c) management activities which are to be undertaken to protect the values for which special protection or management is required;
(d) a period of designation, if any;
(e) a description of the area, including:

(i) the geographical co-ordinates, boundary markers and natural features that delineate the area;

(ii) access to the area by land, sea or air including marine approaches and anchorages, pedestrian and vehicular routes within the area, and aircraft routes and landing areas;

(iii) the location of structures, including scientific stations, research or refuge facilities, both within the area and near to it; and

(iv) the location in or near the area of other Antarctic Specially Protected Areas or Antarctic Specially Managed Areas designated under this Annex, or other

protected areas designated in accordance with measures adopted under other components of the Antarctic Treaty system;

(f) the identification of zones within the area, in which activities are to be prohibited, restricted or managed for the purpose of achieving the aims and objectives referred to in subparagraph (b) above;

(g) maps and photographs that show clearly the boundary of the area in relation to surrounding features and key features within the area;

(h) supporting documentation;

(i) in respect of an area proposed for designation as an Antarctic Specially Protected Area, a clear description of the conditions under which permits may be granted by the appropriate authority regarding:

(i) access to and movement within or over the area;

(ii) activities which are or may be conducted within the area, including restrictions on time and place;

(iii) the installation, modification, or removal of structures;

(iv) the location of field camps;

(v) restrictions on materials and organisms which may be brought into the area;

(vi) the taking of or harmful interference with native flora and fauna;

(vii) the collection or removal of anything not brought into the area by the permit-holder;

(viii) the disposal of waste;

(ix) measures that may be necessary to ensure that the aims and objectives of the Management Plan can continue to be met; and

(x) requirements for reports to be made to the appropriate authority regarding visits to the area;

(j) in respect of an area proposed for designation as an Antarctic Specially Managed Area, a code of conduct regarding:

(i) access to and movement within or over the area;

(ii) activities which are or may be conducted within the area, including restrictions on time and place;

(iii) the installation, modification, or removal of structures;

(iv) the location of field camps;

(v) the taking of or harmful interference with native flora and fauna;

(vi) the collection or removal of anything not brought into the area by the visitor;

(vii) the disposal of waste; and

(viii) any requirements for reports to be made to the appropriate authority regarding visits to the area; and

(k) provisions relating to the circumstances in which Parties should seek t exchange information in advance of activities which they propose to conduct.

ARTICLE 6
DESIGNATION PROCEDURES

1. Proposed Management Plans shall be forwarded to the Committee, the Scientific Committee on Antarctic Research and, as appropriate, to the Commission for the Conservation of Antarctic Marine Living Resources. In formulating its advice to the Antarctic Treaty Consultative Meeting, the Committee shall take into account any comments provided by the Scientific Committee on Antarctic Research and, as appropriate, by the Commission for the Conservation of Antarctic Marine Living Resources. Thereafter Management Plans may be approved by the Antarctic Treaty

Consultative Parties by a measure adopted at an Antarctic Treaty Consultative Meeting in accordance with Article IX(1) of the Antarctic Treaty. Unless the measure specifies otherwise, the Plan shall be deemed to have been approved 90 days after the close of the Antarctic Treaty Consultative Meeting at which it was adopted, unless one or more of the Consultative Parties notifies the Depositary, within that time period, that it wishes an extension of that period or is unable to approve the measure.

2. Having regard to the provisions of Articles 4 and 5 of the Protocol, no marine area shall be designated as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area without the prior approval of the Commission for the Conservation of Antarctic Marine Living Resources.

3. Designation of an Antarctic Specially Protected Area or an Antarctic Specially Managed Area shall be for an indefinite period unless the Management Plan provides otherwise. A review of a Management Plan shall be initiated at least every five years. The Plan shall be updated as necessary.

4. Management Plans may be amended or revoked in accordance with paragraph 1 above.

5. Upon approval Management Plans shall be circulated promptly by the Depositary to all Parties. The Depositary shall maintain a record of all currently approved Management Plans.

ARTICLE 7
PERMITS

1. Each Party shall appoint an appropriate authority to issue permits to enter and engage in activities within an Antarctic Specially Protected Area in accordance with the requirements of the Management Plan relating to that Area. The permit shall be accompanied by the relevant sections of the Management Plan and shall specify the extent and location of the Area, the authorised activities and when, where and by whom the activities are authorised and any other conditions imposed by the Management Plan.

2. In the case of a Specially Protected Area designated as such by past Antarctic Treaty Consultative Meetings which does not have a Management Plan, the appropriate authority may issue a permit for a compelling scientific purpose which cannot be served elsewhere and which will not jeopardise the natural ecological system in that Area.

3. Each Party shall require a permit-holder to carry a copy of the permit while in the Antarctic Specially Protected Area concerned.

ARTICLE 8
HISTORIC SITES AND MONUMENTS

1. Sites or monuments of recognised historic value which have been designated as Antarctic Specially Protected Areas or Antarctic Specially Managed Areas, or which are located within such Areas, shall be listed as Historic Sites and Monuments.

2. Any Party may propose a site or monument of recognised historic value which has not been designated as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area, or which is not located within such an Area, for listing as a Historic Site or Monument. The proposal for listing may be approved by the Antarctic Treaty Consultative Parties by a measure adopted at an Antarctic Treaty Consultative Meeting in accordance with Article IX(1) of the Antarctic Treaty. Unless the measure specifies otherwise, the proposal shall be deemed to have been approved 90 days after the close of the Antarctic Treaty Consultative Meeting at which it was adopted, unless one or more of the Consultative Parties notifies the Depositary, within that time period, that it wishes an extension of that period or is unable to approve the measure.

3. Existing Historic Sites and Monuments which have been listed as such by previous Antarctic Treaty Consultative Meetings shall be included in the list of Historic Sites and Monuments under this Article.

4. Listed Historic Sites and Monuments shall not be damaged, removed or destroyed.

5. The list of Historic Sites and Monuments may be amended in accordance with paragraph 2 above. The Depositary shall maintain a list of current Historic Sites and Monuments.

ARTICLE 9
INFORMATION AND PUBLICITY

1. With a view to ensuring that all persons visiting or proposing to visit Antarctica understand and observe the provisions of this Annex, each Party shall make available information setting forth, in particular:
(a) the location of Antarctic Specially Protected Areas and Antarctic Specially Managed Areas;
(b) listing and maps of those Areas;
(c) the Management Plans, including listings of prohibitions relevant to each Area;
(d) the location of Historic Sites and Monuments and any relevant prohibition or restriction.

2. Each Party shall ensure that the location and, if possible, the limits, of Antarctic Specially Protected Areas, Antarctic Specially Managed Areas and Historic Sites and Monuments are shown on its topographic maps, hydrographic charts and in other relevant publications.

3. Parties shall co-operate to ensure that, where appropriate, the boundaries of Antarctic Specially Protected Areas, Antarctic Specially Managed Areas and Historic Sites and Monuments are suitably marked on the site.

ARTICLE 10
EXCHANGE OF INFORMATION

1. The Parties shall make arrangements for:
(a) collecting and exchanging records, including records of permits and reports of visits, including inspection visits, to Antarctic Specially Protected Areas and reports of inspection visits to Antarctic Specially Managed Areas;

(b) obtaining and exchanging information on any significant change or damage to any Antarctic Specially Managed Area, Antarctic Specially Protected Area or Historic Site or Monument; and
(c) establishing common forms in which records and information shall be submitted by Parties in accordance with paragraph 2 below.

2. Each Party shall inform the other Parties and the Committee before the end of November of each year of the number and nature of permits issued under this Annex in the preceding period of 1st July to 30th June.
3. Each Party conducting, funding or authorising research or other activities in Antarctic Specially Protected Areas or Antarctic Specially Managed Areas shall maintain a record of such activities and in the annual exchange of information in accordance with the Antarctic Treaty shall provide summary descriptions of the activities conducted by persons subject to its jurisdiction in such areas in the preceding year.

4. Each Party shall inform the other Parties and the Committee before the end of November each year of measures it has taken to implement this Annex, including any site inspections and any steps it has taken to address instances of activities in contravention of the provisions of the approved Management Plan for an Antarctic Specially Protected Area or Antarctic Specially Managed Area.

ARTICLE 11
CASES OF EMERGENCY

1. The restrictions laid down and authorised by this Annex shall not apply in cases of emergency involving safety of human life or of ships, aircraft, or equipment and facilities of high value or the protection of the environment.

2. Notice of activities undertaken in cases of emergency shall be circulated immediately to all Parties and to the Committee.

ARTICLE 12
AMENDMENT OR MODIFICATION

1. This Annex may be amended or modified by a measure adopted in accordance with Article IX(1) of the Antarctic Treaty. Unless the measure specifies otherwise, the amendment or modification shall be deemed to have been approved, and shall become effective, one year after the close of the Antarctic Treaty Consultative Meeting at which it was adopted, unless one or more of the Antarctic Treaty Consultative Parties notifies the Depositary, within that time period, that it wishes an extension of that period or that it is unable to approve the measure.

2. Any amendment or modification of this Annex which becomes effective in accordance with paragraph 1 above shall thereafter become effective as to any other Party when notice of approval by it has been received by the Depositary.

Appendix 2 – Summary of Values protected in existing ASPA

No.	Name	Area (km^2)	Scientific values	Historic values	Environmental values	Aesthetic values	Wilderness values
101	Taylor Rookery, Mac. Robertson Land	0.4			1		
102	Rookery Islands, Holme Bay, Mac. Robertson Land	30			1		
103	Ardery Island and Odbert Island, Budd Coast	1.9			1		
104	Sabrina Island, Balleny Islands	NA			1		
105	Beaufort Island, Ross Sea	18.4			1		
106	Cape Hallett, Victoria Land	0.2			1		
107	Dion Islands, Marguerite Bay, Antarctic Peninsula	6	1		1		
108	Green Island, Berthelot Islands, Antarctic Peninsula	0.2			1		
109	Moe Island, South Orkney Islands	1.3	1		1		
110	Lynch Island, South Orkney Islands	0.1			1		
111	Southern Powell Island and adjacent islands, South Orkney Islands	18			1		
112	Coppermine Peninsula, Robert Island, South Shetland Islands	0.9			1		
113	Litchfield Is., Arthur Harbour, Anvers Is., Palmer Archipelago	2.7			1		
114	Northern Coronation Island., South Orkney Islands	88.5			1		
115	Lagotellerie Island, Marguerite Bay, Antarctic Peninsula	1.58			1		

116	New College Valley, Caughley Beach, Cape Bird, Ross Island.	0.49	1		1		
117	Avian Island, off Adelaide Island, Antarctic Peninsula	8.4	1		1		
118	'Cryptogam Ridge' Mount Melbourne, Victoria Land	6	1		1		
119	Forlidas Pond and Davis Valley ponds, Dufek Massif	2	1		1		
120	Pointe-Geologie Archipelago, Terre Adélie	2	1		1	1	
121	CapeRoyds, Ross Island	0.62	1		1		
122	Arrival Heights, Hut Point Peninsula, Ross Island	1.1	1				
123	Barwick Valley, Victoria Land	279	1		1		1
124	Cape Crozier, Ross Island	19	1		1		
125	Fildes Peninsula, King George Island, South Shetland Islands	1.8	1		1		
126	Byers Peninsula, Livingston Island, South Shetland Islands	60.6	1	1	1		
127	Haswell Island	1	1		1		
128	Western shore of Admiralty Bay, King George Island	17.5	1		1		
129	Rothera Point, Adelaida Island	0.1	1				
130	'Tramway Ridge', Mount Erebus, Ross Island	0.1	1		1		
131	Canada Glacier, Lake Fryxell, Taylor Valley, Victoria Land	1.47	1		1		
132	Potter Peninsula, King George Island, South Shetland Islands	1.9	1		1		

133	Harmony Point, Nelson Island, South Shetland Islands	4	1		1		
134	Cierva Point and offshore islands, Danco Coast, Antarctic Peninsula	51.8	1		1		
135	North-eastern Bailey Peninsula, Budd Coast, Wilkes Land	0.5	1		1		
136	Clark Peninsula, Budd Coast, Wilkes Land	9.4	1		1		
137	North-west White Island, McMurdo Sound	170	1		1		
138	Linnaeus Terrace, Asgaard Range, Victoria Land	3.2			1		
139	Biscoe Point, Anvers Island	2.7	1		1		
140	Parts of Deception Island, South Shetland Islands	NA	1		1		
141	'Yukidori Valley', Langhovde, Lützow-Holmbukta	3.6	1		1		
142	Svarthamaren, Mühlig-Hofmannfjella, Dronning Maud Land	6.4	1		1		
143	Marine Plain, Mule Peninsula, Vestfold Hills, Princess Elizabeth Land	23.4	1		1		
144	Chile Bay (Discovery Bay), Greenwich Island, South Shetland Islands	1.9	1		1		
145	Port Foster, Deception Island, South Shetland Islands	1.9	1		1		
146	South Bay, Doumer Island, Palmer Archipelago	1	1		1		
147	Ablation Point-Ganymede Heights,	186	1		1		

	Alexander Island						
148	Mount Flora, Hope Bay, Antarctic Peninsula	0.3	1		1		
149	Cape Shirreff, Livingston Island, South Shetland Islands	3.1	1		1		
150	Ardley Island, Maxwell Bay, King George Island	3	1		1		
151	Lions Rump, King George Island, South Shetland Islands	1.3	1		1		
152	Western Bransfield Strait off Low Island, South Shetland Islands	1021	1		1		
153	Eastern Dallmann Bay off Brabant Island, Palmer Archipelago	676	1		1		
154	Botany Bay, Cape Geology, Victoria Land	21.5	1		1		
155	Cape Evans, Ross Island	0.048	1	1			
156	Lewis Bay, Mount Erebus, Ross Island	15.2		1			
157	Backdoor Bay, Cape Royds, Ross Island	0.056	1	1			
158	Hut Point, Ross Island	132	1	1			
159	Cape Adare, Borchgrevink Coast	0.0025		1		1	
160	Frazier Islands, Wilkes land, East Antarctica	0.6	1		1		
161	Terra Nova Bay	29.4	1		1		
162	Mawson's Hut, Commonwealth Bay, George V Land, East Antarctica	NA	1	1		1	
163	Dakshin Gangotri Glacier	NA	1				
164	Scullin and Murray Monolites, Mac	NA	1		1		

	Robertson Land, East Antarctica						
165	Edmonson Point, Wood Bay, Ross Sea	5.49	1	1	1		
166	Port-Martin, Terre Adélie	NA		1			
167	Hawker Island, Vestfold Hills, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica	512			1		
168	Mount Harding, Grove Mountains, East Antarctica	120	1		1		
169	Amanda Bay, Ingrid Christensen Coast, Princess Elizabeth Land, East Antarctica	18			1		
170	Marion Nunataks, Charcot Island, Antarctic Peninsula	176	1		1		1
171	Narębski Point, Barton Peninsula, King George Island	1	1		1	1	
		3775	52	9	61	4	2

Appendix 3 – Assessment of Environmental ASPA Management Plans

(a) Canada Glacier (Taylor Valley, Victoria Land) – ASPA 131

The Revised Management Plan for the Canada Glacier (ASPA 131), proposed by New Zealand, was approved by the ATCM in 2006 (ATCM XXIX – CEP IX).[24] The ASPA was established to protect the "exceptional intrinsic ecological value" of the area. The area contains the richest plant growth (bryophytes and algae) in the southern Victoria Valley. The area is also a valuable reference site for other Dry Valley ecosystems. The boundaries of this ASPA were changed from the original area in order to include further rich biological communities. The composition and diversity of the plant communities are closely correlated to water availability.

Direct human-induced risks to the values of this site include trampling damage associated with scientific activities (as this area has been well studied) as well as sampling, pollution or bioinvasion of alien species that may occur during scientific study. Damaged areas will be slow to recover.[25] The indirect impacts of climate change affecting water flow are also a significant risk to the ecosystem in the ASPA.

To address the direct human-induced risks outlined above, the Management Plan sets out a number of measures such as:

- Entry to the area is prohibited without a permit;
- Conditions for issuing a permit to enter the area include:
    - The permit shall be accompanied by the relevant sections of the ASPA management plan;
    - It shall be issued for a specified period;
    - It is to be issued only for scientific study of the ecosystem or for essential management purposes;
    - Access will not jeopardize the ecological or scientific values of the area[26];
    - Access to an area of high or medium density requires special conditions;
    - Vehicles are prohibited – access to the area is by foot or by helicopter;
    - Helicopter access is restricted to fixed flight paths to ensure damage to the plant communities is avoided or minimized;
    - Permitted visitors are to keep to established routes where possible;
    - Visitors should avoid walking on visible vegetation, through stream beds and moist ground;
    - Disturbance to water course and water quality is to be minimized (even with activities occurring outside the boundaries of the protected area);
    - All permitted structures shall be removed at the expiry of the Permit;
    - Camping is to occur outside the ASPA wherever possible;

[24] The original protection area was designated in 1985 as a Site of Special Scientific Interest.

[25] Incidentally, areas in this ASPA that have been damaged at known times in the past provide a valuable opportunity to measure the longer-term recovery or recolonisation of sites in response to disturbance, which adds to the scientific value of this area.

[26] This is determined through an assessment of the Preliminary Environmental Evaluation that is filed with the appropriate permitting agency (it is unlikely that Initial Environmental Evaluations or Comprehensive Environmental Evaluations will be relevant within ASPA given that any activity that is not likely to be less than minor or transitory will not be permitted). In New Zealand's case this is the Ministry of Foreign Affairs and Trade (MFAT) operating under the Antarctic (Environmental Protection) Act 1994.

    - No animal, plant or micro-organism is to be introduced and precautions are to be taken to avoid accidental introduction;
    - No herbicides or pesticides shall be taken into the area;
    - Fuel is not to be stored in the area;
    - Taking or harmful interference with native flora and fauna is prohibited except in accordance with a Permit, where the taking or harmful interference with fauna shall be conducted in accordance with the SCAR Code of Conduct;
    - Material removed from the area in accordance with a Permit, that was not brought into the site, must be the minimum required to fulfill scientific or management needs;
    - All wastes, including human wastes must be removed from the area;
    - A visit report will be completed and provided to the permitting authority;
- Designation of the campsite and helicopter landing pad for the ASPA away from the areas of highest diversity and density of plant communities;
- Signage and boundary markers that clearly set out the location and boundaries of the ASPA as well as the entry restrictions;
- Site visits will be made to monitor the area, at least once every five years, to ensure management measures are adequate and to ensure the area still contains the values for which it is designated.

(b) Cape Crozier – ASPA 124

The Revised Management Plan for Cape Crozier (ASPA 124), proposed by the United States of America, was approved by the ATCM in 2008 (ATCM XXXI – CEP XI).[27] The ASPA was established to protect the "rich bird and mammal fauna as well as the microfauna and microflora" of the area. Both the marine and terrestrial elements in the area are of outstanding scientific value also. The boundaries of this ASPA were changed from the original area in order to include areas of vegetative assemblages, which are representative of the Cape Crozier region, and a skua colony. The boundaries have also been changed to assist with compliance (as visitors found the previous boundaries hard to follow).

The ASPA includes the southernmost known colony of Emperor penguins and one of the largest Adelie penguin colonies in Antarctica. The boundaries of this ASPA were designated to include areas of fast ice that were consistently occupied by breeding Emperors. Weddell seals breed in the area while Leopard seals, Crabeater seals and Orca are frequent visitors within the boundaries of the ASPA – forming an important component of the species assemblages and ecosystem of the ASPA. There are also moss, lichen and algae populations within the ASPA.

The ASPA also contains Historic Site and Monument (HSM) #69 (a message post from Scott's National Antarctic Expedition) and HSM 21 (Wilson's stone igloo) and the ASPA has historic values also.

Direct human-induced risks to the values of this site include trampling damage associated with scientific activities and tourism as well as sampling, pollution or bioinvasion of alien species. Direct environmental risks to the ASPA include the

[27] The area has been designated in the past as a Site of Special Scientific Interest.

accumulation of icebergs adjacent to the ASPA which alter sea ice production and distribution as well as impeding the movement of local penguin populations. The indirect impacts of climate change affecting habitat, especially of the Adelie penguins, are also a significant risk to the ecosystem in the ASPA.

To address the direct risks outlined above, the Management Plan sets out a number of measures such as:

- Entry to the area is prohibited without a permit;
- Conditions for issuing a permit to enter the area include:
    - The permit shall be accompanied by the relevant sections of the ASPA management plan;
    - It shall be issued for a specified period;
    - It is to be issued only for scientific study (in particular of avifauna or vegetation assemblages) or for essential management purposes;
    - It may be issued for education or historic reasons provided movement in the area is restricted to the historic sites;
    - Access will not jeopardize the ecological, scientific or historic values of the area;[28]
    - Management activities are in support of the Management Plan;
    - Vehicles are prohibited – access to the area is by foot or by helicopter;
    - Helicopter access is restricted to fixed flight paths to avoid bird colonies;
    - Visitors should keep to natural penguin paths when in the colony;
    - Visitors should avoid walking on visible vegetation, through stream beds and moist ground;
    - All permitted structures shall be removed at the expiry of the Permit;
    - No animal, plant or micro-organism is to be introduced and precautions are to be taken to avoid accidental introduction;
    - No poultry products shall be released into the area;
    - No herbicides or pesticides shall be taken into the area;
    - Fuel is not to be stored in the area;
    - Taking or harmful interference with native flora and fauna is prohibited except in accordance with a Permit, where the taking or harmful interference with fauna shall be conducted in accordance with the SCAR Code of Conduct;
    - Material removed from the area in accordance with a Permit, that was not brought into the site, must be the minimum required to fulfill scientific or management needs;
    - All wastes, including human wastes must be removed from the area;
    - A visit report will be completed and provided to the permitting authority;
- Designation of the field hut, camp sites and helicopter landing sites for the ASPA away from the areas of highest diversity and density of faunal communities;
- Signage and boundary markers that clearly set out the location and boundaries of the ASPA as well as the entry restrictions;

[28] Again this is determined through an assessment of the Preliminary Environmental Evaluation that is filed with the appropriate permitting agency.

- Site visits will be made to monitor the area, at least once every five years, to ensure management measures are adequate and to ensure the area still contains the values for which it is designated.

(c) Sabrina Island (Balleny Islands) – ASPA 104

The Revised Management Plan for Sabrina Island (ASPA 104), proposed by New Zealand, was approved by the ATCM in 2009 (ATCM XXXII – CEP XII).[29] The ASPA was established to protect the "fauna and flora which represent many circumpolar distributions at this latitude" and a representative example of the Balleny Islands, which is the only oceanic archipelago within the Antarctic Coastal Current. The area also has outstanding scientific value. The area provides important breeding and resting habitat for seabirds such as Chinstrap and Adelie penguins. The area also contains species of lichen, algae, bacteria, yeasts and fungi.

Direct human-induced risks to the values of this site include trampling damage and penguin colony disturbance associated with scientific activities as well as pollution or bioinvasion of alien species that may occur during scientific study. The indirect impacts of climate change affecting habitat, especially of the Adelie penguins, are also a significant risk to the ecosystem in the ASPA.

To address the direct risks outlined above, the Management Plan sets out a number of measures. These measures are virtually identical to those imposed for Cape Crozier – ASPA 124.

[29] The original protection area was designated in 1966 as a Specially Protected Area.

Appendix 4 – Environmental Domains Analysis

Domain Labels

A Antarctic Peninsula northern geologic
B Antarctic Peninsula mid-northern latitudes geologic
C Antarctic Peninsula southern geologic
D East Antarctic coastal geologic
E Antarctic Peninsula and Alexander Island main ice fields and glaciers
F Larsen Ice Shelf
G Antarctic Peninsula offshore island geologic
H East Antarctic low latitude glacier tongues
I East Antarctic ice shelves
J Southern latitude coastal fringe ice shelves and floating glaciers
K Northern latitude ice shelves
L Continental coastal-zone ice sheet
M Continental mid-latitude sloping ice
N East Antarctic inland ice sheet
O West Antarctic Ice Sheet
P Ross and Ronne-Filchner ice shelves
Q East Antarctic high interior ice sheet
R Transantarctic Mountains geologic
S McMurdo – South Victoria Land geologic
T Inland continental geologic
U North Victoria Land geologic

Domains by Size

Domain	Area (sq km)
Q	3709111
N	3058936
O	2256425
L	1868548
P	926631
M	902626
I	273119
K	191085
E	178130
J	74984
F	66520
R	31581
U	30578
S	28227
T	24742
B	16592
H	14611
C	14429
D	6155
A	2812
G	966